Dave Marquardt *Dirt-N-Turf Consulting*

Landscape Beds, From the Bottom Up

Amending a soil for flower beds or landscape plantings is not always a simple task. And, while our suppliers have many different compost products available, they seldom are privy to the site conditions or have the agronomic background to properly match the amendment to the needs of the site. With flower budgets in the Chicago area running from a few thousand to as high as $90,000 annually, it has become apparent that we must treat this area of our budgets with the same concern as the rest.

All too often, as we are servicing the fertility-management needs of our clients, the question arises: "Why do you suppose our flower beds are doing so poorly?" After a bit of examination, we discover that the flower and landscape beds have been amended with compost prior to planting.

Golf course superintendents are professionals. They analyze the soil, plan the proper inputs and make the applications. And, while some superintendents apply fertilizers without a soil analysis, never do they apply a product without a label. Never would they consider buying a pallet of unlabeled fertilizer and applying it to any part of the course. Or would they?

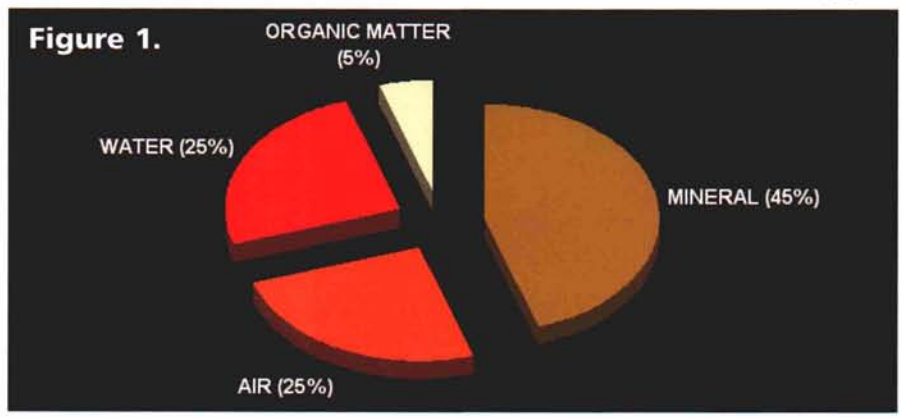
All too often, as we are servicing the fertility-management needs of our clients, the question arises: "Why do you suppose our flower beds are doing so poorly?" After a bit of examination, we discover that the flower and landscape beds have been amended with compost prior to planting. The next question we ask: "What were the chemistries in the compost?"

Chemistries in compost? You bet! It's very simple. When we compost something like leaves, grass clippings and yard waste, we burn off carbon. At the completion of the process, a pile that started three or four feet high may end up only one foot in height. The moisture content has gone up, the carbon content has come down, and in this process, the chemistries have become more concentrated. Not only have three or four feet of chemistries been reduced to one foot, or concentrated by 400%, but the water-holding capacity has also increased. This has in essence become a fertilizer.

Let's step back and look at the problem as a whole. First of all, there is really only one purpose for adding a soil amendment, and that is to improve the soil condition and make it more suitable for planting. As we improve the soil, we generally start by looking at two properties, chemical and physical. Since the physical property is more dominant, we will begin there.

A proper soil environment should be divided as shown in Figure 1. As we see, solids, or mineral content, should be 50% of the soil. The remaining 50% should be evenly divided between water and air-filled pore space. Of the mineral content, some 4% to 7% should be organic matter.

(continued on page 9)



Most soils in our area contain from 2% to 8% organic matter. Increasing low levels of organic matter becomes tricky and depends entirely on the type of soil you begin with. If, for instance, the native soil on your site is sandy, then you will want to choose an amendment that is well-composted and will retain water and nutrition. Since we only see this situation in northern Indiana and Michigan, we will concentrate on Chicago-area soils that are heavier and contain higher amounts of clay.

Most of the soils in the Chicago area would fall into the category of 'clay loam.' This refers to the amount of sand, silt and clay that is found in a soil physical analysis. From a sand, silt and clay perspective, we are presently seeing newer construction sites with clay values well above 30%. Since our maximum allowable specification is 20%, we will need to add sand to lower the clay percentage. Older soils, which account for many of our Chicago courses, have clay contents ranging from 15% to 25% and still need slight sand alterations.

As we know, the problem with excessive clay is that clay will hold excess water and slow the soil's ability to percolate water through the soil profile. Adding sand to alter the clay level becomes a simple answer. However, since adding sand dilutes the level of organic matter, it now becomes necessary to find a suitable organic amendment.

For the most part, we will need to select a product that is regionally available, as well as affordable. That usually means peat, leaf or yard-waste compost, spent mushroom compost or woodchip products. The problem with peat and compost products is that they typically hold from 4% to 6% of their weight in water. Adding these products to a clay loam will increase the water-holding capacity, not improve the soil. Woodchip products may well be a source of organic matter, but what about the carbon? Products such as these will create a nitrogen sink and utilize free nitrogen, often stunting plantings in the bed.

A good alternative is pine bark fines. Pine bark, which is a primary component of many of our potting soils, provides adequate levels of organic matter without the same carbon sink. This is due to the rather high amount of lignin found in pine. Since lignin slows the digestion or composting process, there will only be minimal nitrogen sink. In addition to being a stable organic product, pine generally has a pH of about 4.5. This can be a further benefit in Chicago-area soils.

In the chemistry area, peat, woodchips and pine are generally rather inert. Composts, however, tell another story. Table 1 shows the chemistry analysis of two yard-waste composts along with mushroom compost.

A quick look at Table 1 indicates the following areas of concern:

- The exchange capacities are very high. This indicates that these products will carry a great deal of alkaline mineral.
- The pH of each is very high.
- Soluble sulfur levels are excessive and will lean toward anaerobic.
- Phosphorus is very high. This often leads to chlorosis in susceptible plantings. This is of further concern in light of phosphorus regulations that are sweeping the country.
- Calcium levels are substandard but easily corrected.
- Magnesium is very high. This is troublesome considering the fact that our local soils are already magnesium-excessive.
- Sodium is very excessive. This needs no explanation.
- Soluble salts are excessive.
- Nitrate-N is adequate for growing 200 bushels of corn!
- Ammonium levels will turn soils anaerobic.

As illustrated in this brief expla-

(continued on page 10)

TABLE 1.

	Reference	Yard Waste 1	Yard Waste 2	Mushroom Compost
Cation-Exchange Capacity		40.85	34.06	36.86
pH	6.3	7.8	7.4	7.4
Percent Organic Matter		0.2807	0.269	0.572
Anions				
Soluble Sulfur	35 ppm	135 ppm	122 ppm	1120 ppm
Easily Extractable Phosphorus	35 ppm	637 ppm	348 ppm	450 ppm
Percent Base Saturation				
Calcium	68%	49.85%	57.97%	60.90%
Magnesium	12%	23.18%	18.30%	14.69%
Potassium	5%	22.00%	17.70%	16.05%
Sodium	1%	1.37%	2.07%	4.35%
Other Bases	5%	3.60%	4.00%	4.00%
Hydrogen	10%	0.00%	0.00%	0.00
Soluble Salts		3.13 ppm		7.7 ppm
Nitrate-N	4-10 ppm	126.0 ppm		10.0 ppm
Ammonium-N	5 ppm	132.0 ppm		

The values in the reference column that are not constants have been left blank.

nation, many of the chemistries that accompany these products are very excessive. Therein, whenever we add these amendments, we are also adding the equivalent of a great deal of fertilizer. The problem, as mentioned at the beginning of this article, is that unless we have this data, we are adding an abundance of unwanted and unneeded fertility.

The bottom line is to know what the soil conditions are and then properly match the amendments to the site. This means that we need to choose products that have both the chemical and physical properties we are looking for. A generic recommendation for most Chicagoland soils is to use a blend containing 50% pine fines and 50% sharp, coarse sand. This blend has been very successful used over the top at 2″ to 3″ and incorporated to a depth of 6″ to 8″. This blend is relatively inert and in many ways duplicates the properties of potting soils used by many of the area's nurseries and greenhouses. Pine fines can be purchased at many of the area's mulch companies, such as River City Landscape Supply, White Premium Organics and Midwest Trading Co. Please feel free to call if you have any problem locating pine fines.

Happy gardening!